

## Working Paper:

### Exploring wealth-based inequalities in the repercussions of COVID-19 mitigation measures on adolescents and young adults in Mexico

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#### Abstract

The objective of this paper is to examine wealth-based inequalities in the impact of the COVID-19 pandemic and accompanying educational, economic, and social disruptions among adolescents and young adults in Mexico. We analyzed web-based surveys from the VOCES-19 study completed between November 2020 and February 2021 by 55,692 individuals aged 15-24 from all 32 Mexican states. We employed analyses of the Concentration Index (CI) and Slope Index of Inequality (SII) to measure socioeconomic inequalities in the impact of the pandemic across a variety of indicators grouped into five dimensions: 1) access to health care, 2) psychosocial well-being, 3) exposure to household and neighborhood violence, 4) household income and employment, and 5) education. Findings show that individuals from wealthier households were more likely to be able to access and complete remote learning assignments and to report a consistent ability to make important household purchases throughout the pandemic. Further, economically advantaged individuals were less likely to report decreased access to health services or an increase in household and neighborhood violence during the pandemic. Study results strongly suggest that young adults and adolescents from lower socioeconomic levels are disproportionately bearing the costs of social, economic, and educational disruptions stemming from the COVID-19 pandemic and resulting mitigation policies in Mexico.

#### Introduction

##### Background

Social and health inequalities are defined as the observable differences in health and other social outcomes between groups [1]. In Latin America, inequities are a historical and structural characteristic. While there has been significant progress in reducing inequities in the region since 2000, Latin America and the Caribbean is still the most unequal region in the world [2]. The Gini coefficient of income inequality in Mexico in 2017 was 0.50, one of the highest in the region (see **Figure 1**) [2].

In the past year, the COVID-19 pandemic has uncovered and exacerbated already-present inequalities in societies and different population groups and has put the progress made in reducing poverty in Mexico and Latin America at very serious risk. Regarding direct impacts from disease, prior evidence already indicated that upstream social determinants of health, such as social marginalization, risk exposure, and social inequities are important factors associated with disparities in the incidence of chronic health conditions such as cardiovascular

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disease [3]. Recent evidence from the current pandemic has been consistent with these findings and has shown that the incidence and mortality of COVID-19 is associated with a wide range of sociodemographic factors such as socioeconomic status, ethnic minority status, and environmental factors [4]. Particularly, individuals who are part of low-income and ethnic minority communities have been at higher risk of COVID-19 exposure and transmission, primarily owing to the fact that these individuals are more likely to have essential worker occupations and to live in overcrowded households [4].

The mid- and long-term impacts of the pandemic not directly related to incidence of the disease will also likely be associated with these pre-existing inequalities for all groups. In response to the start of the spread of COVID-19 in March 2020, many governments implemented lockdowns and other strict measures in an effort to contain the virus. In Mexico for instance, non-essential public activities were suspended in the public, private, and social sectors, massive and concentrated events of more than 5,000 individuals were canceled, and school facilities were closed [5]. The result of these and other mitigation measures has been a rise in poverty and inequality in health, income, and other dimensions [6].

In regard to the indirect health impact of these pandemic mitigation measures, the redistribution of health resources to respond to the spread of COVID-19 has gravely impacted access worldwide to essential healthcare services, including sexual and reproductive health (SRH) services [7]. Disruption to general health and SRH services is has been linked with disruptions to the global medical supply chain, the straining of healthcare systems, and reduced demand for services associated with mobility restrictions and patient unwillingness to attend healthcare facilities [8]. In Mexico, the National Population Council (CONAPO) estimates that disruptions in SRH services have increased the unmet need for contraceptives for women 15-49 years old, potentially leading to approximately 122,000 more unplanned pregnancies compared to estimates from before the start of the pandemic [9]. Further, socially excluded groups may be more likely to experience these consequences given Mexico's history of structural barriers to healthcare for marginalized communities, including lack of information about available services, insufficient availability of a wide range of contraceptive methods in all public health facilities, and persisting discrimination against unmarried young women [10, 11].

As for mental health, pandemic mitigation-related factors such as school closures, home confinement, and resulting increased substance use have contributed to poor mental health outcomes, including increased rates of anxiety, depression, and stress for individuals worldwide [12]. Even prior to the pandemic, the mental health care and response system in Mexico was characterized by lack of sufficient services, inequity in the distribution of community and outpatient resources and other barriers to care such as social stigma and discrimination. In 2018, it was estimated that 87.4% of those with mild mental disorders, 77.9% of those with moderate disorders, and 76.2% of those with severe mental disorders did not receive treatment in the country [13]. Given these pre-existing barriers and deficiencies, there is a real concern that a large number of mental health disorders induced by the pandemic will go untreated and will lead to serious long-term consequences, including significant decreases in the population's overall wellbeing and productivity, particularly among the country's most structurally excluded groups [14].

The International Labor Organization's (ILO) report published in January 2021 showed that there are also large inequalities in the employment and income impacts of the pandemic. The report showed that labor income losses were higher for young workers, women, the self-employed, and low- and medium-skilled workers, while

job destruction disproportionately impacted low-paid and low-skill jobs [15]. Additional recent evidence has supported these findings. One paper, which simulated the long-term distributional consequences of the pandemic on the four largest Latin American economies, predicted that the long-run income inequality impacts of the pandemic will be significant, but also found that the income of the poorest individuals in some countries could be protected by additional spending on expanded social assistance. The paper noted that Mexico, however, did not increase social assistance and thus showed the sharpest long-run increase in poverty and income inequality associated with pandemic mitigation measures in simulations [6].

In the realm of education, widespread school closures resulting from the pandemic are already being documented as having disastrous, unequal consequences on student enrollment and achievement measures. Importantly, household inputs are known to be an essential component of the learning process. The level of household inputs to complement school inputs during school closures were, of course, unevenly distributed along socioeconomic lines, generating extremely varied learning experiences by students even within the same country [16]. In Mexico, for example, only half of all basic education students had access to a technological device connected to the internet from home during the pandemic. Among students from the poorest households, this share was less than 25% [16]. This inability of the most vulnerable students to stay connected will have long-term consequences. While potential learning losses may be regained, the curbing of educational aspirations or disengagement from the school system can have irreversible effects on less advantaged students' outcomes and employment possibilities down the line [17].

Finally, in Mexico and other countries around the world, increases in domestic and neighborhood violence, particularly against women and girls, has also been identified since the start of the pandemic. Factors such as social distancing mandates, school closures, reduced access to violence-related services and health services, as well as limitations on economic activities, have increased the exposure of individuals to violence in their households [18]. Thus far, there is little evidence on the relationship between socioeconomic status and exposure to violence, particularly in Mexico and the rest of Latin America. However, there is a growing body of literature that suggests links between economic insecurity and violence against women and children [19]. Economic insecurity has been found to be associated with poor coping strategies (substance abuse, taking on debt, etc.) at the household and personal level, which in turn is associated with acute and chronic stress that triggers conflict [19].

Undoubtedly, all subsections of the global population will be impacted in some way by the mid- and long-term effects outlined above, as well as by the widened inequalities in access and effects being experienced within each of the dimensions. However, many indications suggest that the age group consisting of adolescents and young adults has been and likely will continue to be one of the most gravely affected by the COVID-19 pandemic, particularly due to its implications on this group's ability achieve the milestones of adulthood (economic independence, marriage, completion of education). Failure to meet these milestones can have a negative impact on a myriad of outcomes, with consequences prolonging well into adulthood [20].

Despite the fact that there is a growing literature on the impact of the COVID-19 pandemic on increases in inequality and poverty in Latin America and globally, our study is, to the best of our knowledge, the first that attempts to measure the degree of socioeconomic-related inequalities in the impact of the COVID-19 pandemic on a broad range of social, health, and economic indicators specifically among adolescents and young adults in Latin America.

## Objective

The main objective of this study is to analyze how COVID-19 mitigation measures might be exacerbating social and economic inequalities among adolescents and young adults in Mexico. Given the evidence presented in the background section above, we expect that adolescents and young adults in lower income households will experience greater educational, social, and economic repercussions compared to adolescents and young adults in higher income households.

## Methods

A national cross-sectional study was conducted in Mexico with adolescents (15-17 years) and young adults (18-24 years) between November 2020 and February 2021, through online surveys [21]. This cross-sectional study is part of a larger study, the Violence Outcomes in COVID-19 Era Study (VOCES-19), which is being carried out by the Population Council in Mexico and aims to understand, in different time periods, the impact of the COVID-19 pandemic on the experience and perception of violence among this population, as well as its impact on other social, economic, and health outcomes. The study was carried out in collaboration with the National Institute of the Youth (IMJUVE) and the National Center for Gender Equity and Reproductive Health (CNEGSR) in Mexico, both governmental institutions whose mandates are to work with the youth to improve their living conditions.

### *Study design and participants*

The target population for the study are adolescents between 15 and 17 years of age and young adults between 18 and 24 years who were living in Mexico at the time of the study. Due to the limitations associated to COVID-19 pandemic for selecting a probabilistic sample, we used a convenience sampling strategy to select participants. We reproduced main average characteristics of the population by state and by municipality (for Mexico City) with a post-stratification based on selected characteristics from the Intercensal Survey 2015. The target number of participants was defined based on the expected prevalence of violence and, as this is highly variable across the country, a conservative approach was followed, estimating the required sample size for a prevalence of 50% with a margin of error of 5%. This resulted in a number of 384 participants for each estimation unit: 31 states and 16 municipalities in Mexico City, with a total expected number of 18,048 participants nationwide.

To achieve the estimated number of participants, a VOCES-19 webpage was created in September 2020 (<https://vocescontralaviolencia.org>), as well as social media pages for the study in Facebook and Instagram, to start the dissemination of the study and the first round of data collection. The survey was disseminated through different strategies: 1) VOCES-19, IMJUVE, and CNEGSR social media platforms; 2) the *Jóvenes Construyendo el Futuro* web-page; 3) youth-related organizations and networks which the study team contacted during the survey implementation (Fundación de Apoyo a la Juventud, IAP; Red Viral; Construye-T); 4) radio spots in different states where response rates were low (Mexico City, Sinaloa and Sonora); 5) two press releases in January and February 2021; and, 6) through the Ministry of Health and the Ministry of Education and other academic institutions (e.g., Colegio de Bachilleres), so that they could disseminate information about the study among their students. In some states, such as Queretaro and Tabasco, institutions and organizations heard about

the project and shared it with their communities and partners, which led to an important increase in responses from these states.

A total of 123,899 participants entered the survey from November 1<sup>st</sup>, 2020, up to February 28<sup>th</sup>, 2021. Of the total participants that entered the survey, 55,692 completed it, signifying a survey completion rate of 44.9%. For the present analysis, we have only included data from the 55,692 participants with completed surveys.

The questionnaire employed in the first round of data collection for VOCES-19 is a comprehensive instrument comprised of 129 questions categorized into 12 dimensions: 1) Sociodemographic Characteristics, 2) Household Characteristics, 3) COVID-19, 4) Education and Learning, 5) Employment and Family Financial Health, 6) Household Dynamics and Gender Norms, 7) Perception of Gender Norms, 8) General Health, 9) Sexual and Reproductive Health, 10) Consumption of Substances, 11) Perceptions and Experiences of Violence, and 12) Resilience.

Survey questions were adapted from different national and international surveys. The survey was programmed in SurveyMonkey and piloted with approximately 50 adolescents and young adults to evaluate if questions were understandable, time to completion, and relevance of questions asked.

## **Analysis**

Data were collected through the SurveyMonkey software and stored as de-identified data in Excel format in two researchers' computers and in a web-based application: SharePoint from the Population Council. In order to account for differences in the distributions of sociodemographic characteristics between our sample and the larger population of this age range, all analyses involved differential weights for observations, calculated according to individuals' state of residence, level of rurality of the municipality of residence, sex, and age group. This procedure ensured that the contribution of each observation in the indicators presented was equivalent to the relative weight of the specific subgroup in the total population between 15 and 24 years of age in Mexico. Data were analyzed in Stata version 16.0.

For inequality measures, we utilized the Slope Index of Inequality (SII) and the Wagstaff-adjusted Concentration Index (CI) to measure inequalities among individuals based on socioeconomic status (SES). To conduct these analyses, a proxy measure of per capita household income was estimated to use as a socioeconomic stratifier. This proxy measure is an imputation based on household and dwelling characteristics and used as reference Mexico's National Survey on Income and Expenditures (ENIGH for its Spanish acronym). Using variables available in both the ENIGH and VOCES-19 surveys, we regressed per-capita income against a set of household and dwelling variables in the ENIGH and then used the coefficients to impute values for VOCES-19 participants. A weighted ranking was then done of all individuals in the sample according to this indicator, ordering individuals from the most disadvantaged to the most advantaged. This ranking variable was utilized in all subsequent inequality calculations.

The SII represents the absolute difference in the predicted values of an indicator between the individuals with the highest and lowest socioeconomic ranking in the population, considering the integral distribution of the stratifier using a linear regression model [1]. Negative values of the SII show that the indicator measured is higher in the poorest share of participants compared to the richest share of participants [1].

The CI indicates the degree to which an indicator is concentrated between the most disadvantaged or the most advantaged individuals. The index is derived from a concentration curve for the indicator by individuals ordered by socioeconomic ranking and is defined as twice the area between this curve and the line of equality (the 45-degree line) [1]. The CI has a negative value when the indicator is concentrated in the most disadvantaged and a positive value when it is concentrated in the most advantaged, while a value of zero indicates no inequality for that indicator. The Wagstaff- adjusted CI is used for indicators reported as percentages or prevalence [22].

## Results

A total of 55,692 adolescents and young adults from the 32 states in Mexico accessed and completed the survey. **Table 1** presents the weighted demographic characteristics of VOCES-19 participants. Adolescents between the ages of 15 and 17 years made up 31% of participants, while young adults between the ages of 18 and 24 years made up the remaining 69%. The average age of participants was 19.2 (SE $\pm$  0.03). 30% of total participants self-identified either entirely or in part as Indigenous and/or Afro-descendant. As for socioeconomic level, groups were balanced between socioeconomic quintiles.

To measure socioeconomic inequalities in the repercussions of COVID-19 mitigation measures, we conducted inequality analyses on a variety of indicators grouped into five dimensions of adolescents' and young adults' lives: 1) access to health care, 2) psychosocial well-being, 3) household income and employment, 4) education, and 5) exposure to household and neighborhood violence. Results for measures of inequality in all indicators are reported separately for adolescents (15-17 y/o) and young adults (18-24 y/o), acknowledging the important life-stage differences between these two populations. See **Tables 2 and 3**, located in the appendix, for detailed results of these analyses for all indicators. **Figures 2 and 3**, also located in the appendix, provide a visualization of concentration index coefficients for all indicators for which the values resulted significant at the 95% significance level.

In terms of access to health care services, the concentration index indicated larger disruption in general health care access among adolescents and young adults from lower income households (CI: -.06 [Standard Error (SE): .01] for adolescents and -.09 [SE: .02] for young adults). For this indicator, the slope index represented a difference of 10 percentage points in both age groups (SE: .02 for adolescents; SE: .03 for young adults) in the probability of disruption of access between individuals in the bottom and in the top of the socioeconomic stratifier. Similarly, disruption of sexual and reproductive health services was more common for individuals at the bottom of the SE indicator (CI: -.12 [SE: .05] for adolescents and -.15 [SE: .04] for young adults), as reported by respondents. The difference in the probability of experiencing disruption in SRH services based on the SII was of 12 percentage points (SE: .06) for adolescents and 21 percentage points (SE: .07) for young adults (see Tables 2 and 3).

In the dimension of psychosocial wellbeing, we utilized the Patient Health Questionnaire (PHQ-9) and the Generalized Anxiety Disorder Questionnaire (GAD-7) to assess participant mental health in the two weeks prior to the survey. A cut-off score of five or more points for the PHQ-9 and GAD-7 scales was used to categorize participants as presenting or not presenting mild to severe depressive or anxiety symptoms, respectively. Inequality analyses showed that among adolescents, displaying symptoms of depression was concentrated among individuals in higher socioeconomic level households, with a CI value of .04 (SE: .01) and

the SII reporting a six-percentage point (SE: .02) difference between the two socioeconomic extremes. No income-based inequalities were found in the percentage of adolescents displaying symptoms of anxiety, while there were no inequalities among young adults in displaying either symptoms of anxiety or depression. Additionally, the percentage of participants who stated that troubling thoughts have bothered them more since the start of the pandemic than before was similarly more concentrated in more advantaged households among both adolescents (CI: .03 [SE: .01]) and young adults (CI: .07 [SE: .02]). The SII for this indicator was nine percentage points (SE: .02) and 13 percentage points (SE: .03) for adolescents and young adults, respectively (see Tables 2 and 3).

Within the dimension of household financial health, we found relatively large inequalities favoring the more advantaged households in both age groups. The CI showed that the indicator for whether someone in the respondents' household had lost a job or closed their business due to COVID was largely concentrated in the lower SE levels (CI: -.24 [SE: .01] for adolescents; -.31 [SE: .02] for young adults). The probability of this occurrence was 38 percentage points (SE: .02) and 45 percentage points (SE: .03) lower for adolescents and young adults in the higher SE levels, respectively. Large inequalities are also present in the indicators for whether participants stated that their household has never or almost never been able to buy enough food for everyone in the household or been able to pay important household bills during the pandemic. The CI showed much higher concentrations among the least advantaged in never or almost never being able to buy enough food (CI: -.36 [SE: .04] for adolescents; CI: -.46 [SE: .06] for young adults) and never or almost never being able to pay important bills (CI: -.36 [SE: .02] for adolescents; CI: -.39 [SE: .04] for young adults). According to the SII, there is a six-percentage point difference among adolescents' households (SE: .01) and a nine-point difference among young adults' households (SE: .01) in the probability of never or almost never being able to buy enough food during the pandemic between the two socioeconomic extremes. Further, there is a 16-percentage point difference between the two socioeconomic extremes among both adolescents' (SE: .01) and young adults' households (SE: .01) in the probability of never or almost never being able to pay important bills during the pandemic (see Tables 2 and 3).

In the education dimension, the CI indicated higher levels of partial or complete disagreement among adolescents and young adults enrolled in school who come from lower income households with the statement of having the necessary means to access (CI: -.27 [SE: .02] for adolescents and -.36 [SE: .03] for young adults) and to complete their homework assignments since their schools closed (CI: -.28 [SE: .02] for adolescents and -.35 [SE: .03] for young adults). The difference in probability of disagreeing with these statements based on the SII was of 25 percentage points (SE: .02) for adolescents and 38 percentage points (SE: .03) for young adults regarding means to access their homework assignments and 24 percentage points (SE: .01) and 34 percentage points (SE: .03) for young adults regarding being able to complete their homework assignment. Additionally, the CI indicated larger concentrations of adolescents and young adults from higher income households that reported attending at least 70% of their remote classes since the closing of their school facilities (CI: .22 [SE: .02] for adolescents and .25 [SE: .04] for young adults), with the SII representing a difference of 10 percentage points (SE: .01) in the probability of having attended the majority of their classes between enrolled students the top and in the bottom of the socioeconomic stratifier and of 13 percentage points (SE: .02) for young adults. Finally, disagreeing with the statement that they are learning the same now than when their school was in-person, on the other hand, is not dependent on SES.

Finally, in regards to exposure to violence, the CI indicated that a higher concentration of adolescents and young adults from lower income households reported that their first exposure to violence in their household perpetrated by a family member occurred following the start of the pandemic (CI: -.13 [SE: .05] for adolescents and -.22 [SE: .07] for young adults), with the SII representing a difference of three percentage points (SE: .01) for adolescents and of six percentage points (SE: .02) for young adults. Reporting an increase in violence (either in frequency or severity) in their household since the start of the pandemic is also associated with lower SES (CI: -.12 [SE: .02] for adolescents and -.23 [SE: .03] for young adults), with the SII representing a difference of 15 percentage points (SE: .02) in the probability of violence increasing in their households since the start of the pandemic between adolescents in the bottom and in the top of the socioeconomic indicator and of 28 percentage points (SE: .04) for young adults. Additionally, a higher concentration of more disadvantaged adolescents and young adults report feeling less safe in their households since the start of the pandemic (CI: -.12 [SE: .02] for adolescents and -.10 [SE: .03] for young adults), as well as in their neighborhoods (CI: -.09 [SE: .01] for adolescents and -.11 [SE: .21] for young adults) (see Tables 2 and 3).

## **Discussion**

The present analysis shows that wealth-based inequalities are present in the impact of COVID-19 mitigation measures among adolescents and young adults in Mexico. These findings were in line with our hypothesis. Based on our Concentration Index and Slope Index of Inequality estimations, we find that adolescents and young adults from lower income households are being the most impacted in terms of health, violence, labor, and education indicators. These results emphasize the need to design solutions and public policy that account for the unequal impacts of the pandemic in order to offer a targeted and effective response that reduces instead of exacerbates social and economic inequalities.

The biggest inequalities in this study among young people were found within the dimensions of household financial health and education. In regard to the unequal impacts of the pandemic on overall household employment and financial health, our findings align with recent evidence showing that the impact of COVID-19 lockdown policies in Latin America have had the largest effect on the most vulnerable sectors of society [23]. In terms of unemployment, our study found that the likelihood that someone in the respondents' household had lost a job or closed their business due to COVID was largely concentrated in the lowest socioeconomic levels. This is consistent with reports that job loss, particularly during the first few months of the pandemic, was proportionally higher in the informal sector (in contrast to trends from prior economic crises in the region, in which the informal sector mostly absorbed workers leaving the formal sector) [24]. Notably, over 80% of those in the lowest income quintile in the region work in this sector, meaning they have no access to key social protections such as unemployment insurance and pensions [25,26]

Additionally, one of the most unequally distributed indicators in our study was the percentage of participants whose households never or almost never were able to buy enough food for everyone in the household during the pandemic, with a significantly higher concentration of lower-income adolescents and young adults reporting this than higher-income participants. Several other studies have also pointed to the fact that food insecurity in Latin America has risen throughout the pandemic, particularly in low-SES households [25,27]. One study by Gaitán-Rossi et al. using data from the April, May, and June 2020 ENCOVID-19 monthly telephone cross-sectional survey in Mexico showed that in those months, households in the lowest SES presented the highest prevalence of moderate (28.9%) and severe food insecurity (20.9%) [27].

Several indicators related to education in our study, particularly relating to students' ability to access online schooling and complete their assignments, also presented relatively high indices of inequality among both adolescents and young adults. For instance, adolescents at the bottom of the socioeconomic stratifier were around 24 percentage points more likely than their peers at the top of the stratifier to state that they did not have the means available to consistently complete and submit their homework assignments throughout the pandemic. This gap was greater still among young adults: 34 percentage points in the same direction. These findings are consistent with pre-pandemic data from the region which show substantial gaps between students in the two socioeconomic extremes in access to learning resources. According to UNICEF data from 2018, the probability that a student belonging to a household in the highest SE quintile in Latin America would have a computer for studying is 5.5 times greater than for students in the lowest quintile, with the differences for tablet ownership being even greater [28].

Study findings show smaller, yet still significant inequalities in health-related impacts among Mexican adolescents and young adults, including in access to sexual and reproductive health care. VOCES-19 results show that interrupted access to health care services since the start of the pandemic has been primarily concentrated among low-SES adolescents and young adults. The most striking inequality found in this dimension was among young adults who tried to access SRH services during the pandemic; individuals in this age group from the lowest-income households were around 21 percentage points more likely than their highest-income peers to state that their access to these services was impacted by the pandemic. These findings align with sentiments expressed in interviews carried out by UNDP country offices with poor and vulnerable populations in 15 Latin American countries in 2020. These reports found that five of the 15 countries named health-related issues such as access to medication and health services as their first or second most important concern, and that the restriction of services was a bigger problem for the children of less structured households [25].

Finally, among both adolescents and young adults in this study, the only indicators that indicate a greater impact of pandemic measures for wealthier participants in comparison to poorer participants were those related to mental health. The percentages of adolescents who experienced symptoms of depression in the two weeks prior to taking the survey, and of adolescents who reported experiencing increases in troubling symptoms since the start of the pandemic compared to before, were both more concentrated among participants with a higher socioeconomic status. It is unclear whether these results align with findings from other countries and regions, as few studies have sought to examine the relationship between socioeconomic status and prevalence of depression and anxiety symptoms during the pandemic. While we cannot be sure about the explanation for this unequal distribution of depressive symptoms and the increase in troubling feelings, it is important to point out that these indicators are not related to access to mental health care services, only to perception of their own troubling feelings. As already discussed, analysis of the indicators related to access to different health care services found that impacted access was more concentrated among less advantaged youth.

### *Study limitations*

The present study has several limitations that are worth mentioning. The first limitation is that due to the convenience sampling methodology for participant selection, the survey is not representative of the youth living in Mexico. However, in order to account for differences in the distributions of sociodemographic characteristics

between our sample and the larger population of this age range, all analyses involved differential weights for observations, calculated according to individuals' state of residence, level of rurality of the municipality of residence, sex, and age group, ensuring that the contribution of each observation in the indicators presented was equivalent to the relative weight of the specific subgroup in the total population between 15 and 24 years of age in Mexico.

The second limitation is the selection bias inherent to the design of the study. Since VOCES-19 was conducted during the COVID-19 pandemic and when social distancing mandates were being implemented by the Mexican government, the study was conceptualized as an online survey. Thus, only youth with access to the internet and to a cell phone, tablet, or computer could participate in the survey. This excluded from the study the most vulnerable youth. Due to this limitation, the research team decided to carry out a parallel study with homeless youth in Mexico City to capture their voices and experience. This study will be implemented in the last quarter of 2021 and results will be presented in a separate article.

Finally, conducting the study with online surveys posed additional limitations. It prevented the research team from conducting quality controls during the filling of the survey and thus, we were not able to validate some of the responses. Nevertheless, the research team conducted internal consistency tests for scales and indexes. Additionally, the cohort follow-up will enable the research team to validate certain responses and mitigate these limitations.

#### *Future work*

VOCES-19 aims to be a repository of data and evidence for decision-making in public policies designed for the youth in Mexico. A data visualization tool with findings from the study is available in the VOCES-19 webpage (<https://vocescontralaviolencia.org>), and the de-identified database will also be made freely accessible through the website. The next round of the study will be implemented from November 2021 to February 2022. The follow-up of VOCES-19 participants will allow us to learn more about the continuing impacts of the pandemic on Mexican youth.

As for further research with data from this first round, we will continue to analyze the differential impacts of the pandemic by gender, socioeconomic status, and ethnicity. We are currently conducting a decomposition analysis to identify the main drivers of the socioeconomic inequalities described in this article. We will also include an analysis of these inequalities by gender, to explore if socioeconomic status interacts with gender, synergizing inequalities by socioeconomic status in this population. Additionally, since the main focus of the VOCES-19 study is on violence, we will conduct a multilevel analysis to better understand the social determinants associated with an increase in exposure to violence during the pandemic. Finally, we are preparing a manuscript to describe the methodology of the VOCES-19 study, as well as a manuscript regarding main descriptive findings of the study.

#### **Conclusion**

The major implication of the results of this analysis is that when it comes to providing services in response to the shocks to young people induced by the COVID-19 pandemic, it will be essential for the Mexican government and others worldwide, to understand the differential impact experienced by different groups at

varying levels of marginalization and social exclusion, and to not simply focus on improving the average for these indicators. Further, the findings outlined in this study highlight the need for more and higher quality data to measure and monitor the reduction of wealth-based inequalities in a wide variety of sectors. If pre-existing inequalities are not taken into account when designing and implementing public policies, instead of aiding those most in need, these can exacerbate the inequalities among groups, especially in times of crisis. This data can aid in designing or reformulating already established policies for the youth in Mexico to target those most in need and help build a better future for all.

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## Appendix

**Table 1. Weighted sociodemographic characteristics of VOCES-19 participants**

Variable	15-17 years % (95% CI)	18-24 years % (95% CI)	Total % (95% CI)
	n=44,955	n=10,737	N=55,692
Age in years mean (95% CI)	16.0 (16.0,16.0)	20.7 (20.6,20.7)	19.2 (19.1,19.3)
Age group	31.4 (30.6,32.1)	68.5 (67.8,69.3)	-
<b>Gender</b>			
Female	49.0 (48.2,49.9)	51.4 (49.8,52.9)	50.6 (49.5,51.7)
Male	49.6 (48.7,50.5)	47.2 (45.6,48.7)	47.9 (46.8,49.0)
Non-binary	1.2 (1.0, 1.4)	1.3 (1.0,1.8)	1.3 (1.0,1.6)
<b>Sexual orientation</b>			
Heterosexual	84.7 (84.0, 85.3)	81.5 (80.1,82.8)	82.4 (81.5,83.4)
Homosexual, lesbian or gay	1.9 (1.7,2.2)	5.6 (4.8,6.6)	4.5 (3.0,5.2)
Bisexual	10.0 (9.5,10.5)	10.4 (9.4,11.4)	10.2 (9.6, 11.0)
Other	3.2 (2.9,3.6)	2.3 (1.9,2.8)	2.6 (2.3,3.0)
<b>Ethnicity</b>			
Self-identifies as indigenous and/or Afro Mexican (I/AM)	31.9 (31.0,32.7)	28.5 (27.2,29.9)	29.5 (28.6,30.5)
<b>Socioeconomic quintile</b>			
1st Quintile	19.1 (18.4,19.8)	20.3 (19.2,21.5)	19.9 (19.1,20.8)
2nd Quintile	19.4 (18.7,20.0)	19.0 (17.8,20.1)	19.1 (18.3,19.9)
3rd Quintile	19.5 (18.8,20.2)	17.3 (16.2,18.4)	18.0 (17.2,18.8)
4th Quintile	20.9 (20.1,21.6)	17.5 (16.4,18.7)	18.5 (17.7,19.4)
5th Quintile	20.9 (20.3,21.6)	25.7 (24.3,27.1)	24.2 (23.2,25.2)
<b>Marital status</b>			
Lives with partner(s) (marriage/cohabitating)	0.7 (0.6,0.9)	9.1 (8.2,10.2)	6.6 (6.0,7.4)
Has a partner but does not live with him/her	19.9 (19.2,20.6)	30.9 (29.5,32.3)	27.6 (26.6,28.7)
Single	69.1 (68.3,69.9)	55.3 (53.8,56.9)	59.4 (58.3,60.5)
Other (separated, divorced or widowed)	0.5 (0.4,0.6)	0.6 (0.4,0.8)	0.6 (0.4,0.7)
<b>Education and employment status</b>			
Enrolled in school at the time of the survey	99.5 (99.3,99.6)	75.0 (73.5,76.5)	82.6 (81.6,83.7)
Working at the time of the survey	22.5 (21.8,23.3)	44.1 (42.5,45.6)	37.5 (36.3,38.6)

**Table 2. Concentration index\* (SE) for education, employment, psychosocial wellbeing, access to health services, and violence indicators for adolescents and young adults in Mexico, ranked using a proxy measure of per capita household income as a socioeconomic stratifier**

<b>I. Access to Health Services</b>				
		<b>15–17- Year- Olds</b>	<b>18–24- Year-olds</b>	
<b>No.</b>	<b>Indicator</b>	<b>CI (SE)</b>	<b>CI (SE)</b>	<b>Indicator description</b>
1	Access to general health services affected by the pandemic	-.063*** (.012)	-.094*** (.023)	Percentage of respondents who perceive that since the start of the pandemic, access to general health care services have been impacted either for themselves or for a family member
2	Access to sexual and reproductive health services affected by the pandemic	-.122* (.056)	-.152** (.049)	Percentage of respondents who perceive that since the start of the pandemic, their own access to sexual and reproductive health care services have been impacted
<b>II. Psychosocial Wellbeing</b>				
		<b>15–17- Year- Olds</b>	<b>18–24- Year-olds</b>	
<b>No.</b>	<b>Indicator</b>	<b>CI (SE)</b>	<b>CI (SE)</b>	<b>Indicator description</b>
3	Experienced symptoms of depression	.041*** (.012)	.035 (.022)	Percentage of respondents who displayed symptoms of depression in the two weeks prior to completing the survey, per PHQ-9 scale scoring
4	Experienced symptoms of anxiety	.001 (.011)	-.013 (.020)	Percentage of respondents who displayed symptoms of anxiety in the two weeks prior to completing the survey, per GAD-7 scale scoring
5	Experienced thoughts of suicide or hurting themselves	-.009 (.012)	.008 (.021)	Percentage of respondents who, in the two weeks prior to taking the survey, indicated having experienced thoughts of suicide or self-harm at least some days
6	Experienced increase in symptoms since the start of the pandemic	.031** (.011)	.073*** (.020)	Percentage of respondents who indicated that negative feelings increased since the start of the pandemic, as compared to before
<b>III. Household and Neighborhood Violence</b>				
		<b>15–17- Year- Olds</b>	<b>18–24- Year-olds</b>	
<b>No.</b>	<b>Indicator</b>	<b>CI (SE)</b>	<b>CI (SE)</b>	<b>Indicator description</b>
7	Experienced household violence for the first time following the start of the pandemic	-.129** (.045)	-.221** (.069)	Among respondents who have ever experienced psychological, physical, or sexual violence at home, percentage of respondents who report having only experienced this violence following the start of the pandemic, not before
8	Experienced increase in household violence since the start of the pandemic	-.115*** (.019)	-.234*** (.029)	Among respondents who have ever experienced psychological, physical, or sexual violence at home, percentage of respondents who report an increase in severity, frequency, or both in this violence since the start of the pandemic
9	Feels less safe in the household since the start of the pandemic	-.115*** (.019)	-.100** (.034)	Percentage of respondents who report feeling less at home than they did before the start of the pandemic

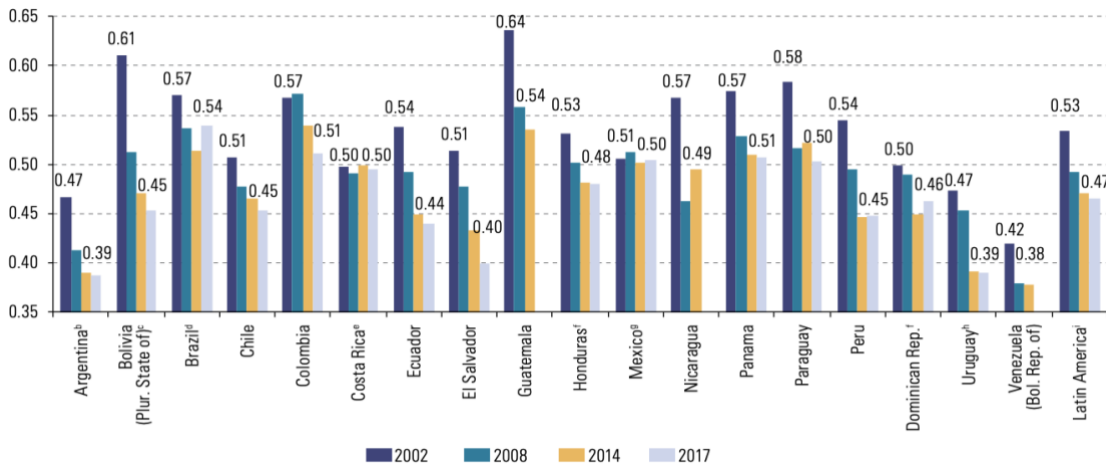
10	Feels less safe in the neighborhood since the start of the pandemic	-.093***	-.113***	Percentage of respondents who report feeling less at in their neighborhood than they did before the start of the pandemic
		(.012)	(.021)	
11	Increase in cyberbullying since the start of the pandemic	-.006	-.119***	Among respondents who have ever experienced virtual harassment, percentage of respondents who report an increase in severity, frequency, or both in this behavior since the start of the pandemic
		(.012)	(.022)	
<b>IV. Employment and Family Financial Health</b>				
		<b>15–17- Year- Olds</b>	<b>18–24- Year-olds</b>	
<b>No.</b>	<b>Indicator</b>	<b>CI (SE)</b>	<b>CI (SE)</b>	<b>Indicator description</b>
12	Family member loss of job or business due to COVID-19 containment measures	-.306***	-.341***	Percentage of respondents who indicated that at least one member of their family lost their job or had to close down their business as a result of COVID-19 lockdown and containment measures
		(.011)	(.018)	
13	Inability to pay important household bills during the pandemic	-.359***	-.388***	Percentage of respondents whose family has never or almost never been able to pay important bills such as rent since the start of the pandemic
		(.024)	(.035)	
14	Inability to buy enough food for everyone in the household during the pandemic	-.357***	-.460***	Percentage of respondents whose family has never or almost never been able to pay important bills such as rent since the start of the pandemic
		(.036)	(.055)	
<b>V. Education and Learning</b>				
		<b>15–17- Year- Olds</b>	<b>18–24- Year-olds</b>	
<b>No.</b>	<b>Indicator</b>	<b>CI (SE)</b>	<b>CI (SE)</b>	<b>Indicator description</b>
15	Inability to access homework or assignments	-.274***	-.362***	Percentage of respondents who disagree or strongly disagree with the following statement: "I have the means necessary to access (see, download, and work on) my homework and assignments" since the beginning of the pandemic
		(.016)	(.025)	
16	Inability to complete and submit homework or assignments	-.275***	-.350***	Percentage of respondents who disagree or strongly disagree with the following statement: "I have the means necessary to complete and turn in my homework and assignments" since the beginning of the pandemic
		(.017)	(.025)	
17	Attendance to the majority of remote classes	.216***	.246***	Percentage of respondents who have attended at least 70% of their classes since the closure of their school facilities
		(.022)	(.036)	
18	Perception of less learning since the pandemic	-.012	-.039	Percentage of respondents who disagree or strongly disagree with the following statement: "I perceive that I learn more now than I did when I attended school in person"
		(.011)	(.022)	
<b>Notes:</b> *p-value <0.05; ** <0.01; *** <0.001; In this analysis, negative values indicate pro-poor indicators, or that individuals with the lowest socioeconomic levels concentrate around higher values of the indicator.				

**Table 3. Slope Index of Inequality\* (SE) for education, employment, psychosocial wellbeing, access to health services, and violence indicators for adolescents and young adults in Mexico, ranked using a proxy measure of per capita household income as a socioeconomic stratifier**

<b>I. Access to Health Services</b>				
		<b>15–17- Year- Olds</b>	<b>18–24- Year-olds</b>	
<b>No.</b>	<b>Indicator</b>	<b>SII (SE)</b>	<b>SII (SE)</b>	<b>Indicator description</b>
1	Access to general health services affected by the pandemic	-0.10*** (0.019)	-0.10*** (0.025)	Percentage of respondents who perceive that since the start of the pandemic, access to general health care services have been impacted either for themselves or for a family member
2	Access to sexual and reproductive health services affected by the pandemic	-0.12* (0.056)	-0.21** (0.068)	Percentage of respondents who perceive that since the start of the pandemic, their own access to sexual and reproductive health care services have been impacted
<b>II. Psychosocial Wellbeing</b>				
		<b>15–17- Year- Olds</b>	<b>18–24- Year-olds</b>	
<b>No.</b>	<b>Indicator</b>	<b>SII (SE)</b>	<b>SII (SE)</b>	<b>Indicator description</b>
3	Experienced symptoms of depression	0.06** (0.018)	0.04 (0.027)	Percentage of respondents who displayed symptoms of depression in the two weeks prior to completing the survey, per PHQ-9 scale scoring
4	Experienced symptoms of anxiety	0.00 (0.017)	-0.02 (0.028)	Percentage of respondents who displayed symptoms of anxiety in the two weeks prior to completing the survey, per GAD-7 scale scoring
5	Experienced thoughts of suicide or hurting themselves	-0.01 (0.015)	0.01 (0.025)	In the two weeks prior to taking the survey, percentage of respondents who indicated having experienced thoughts of suicide or self-harm at least some days
6	Experienced increase in symptoms since the start of the pandemic	0.09*** (0.019)	0.13*** (0.027)	Percentage of respondents who indicated that negative feelings increased since the start of the pandemic, as compared to before
<b>III. Household and Neighborhood Violence</b>				
		<b>15–17- Year- Olds</b>	<b>18–24- Year-olds</b>	
<b>No.</b>	<b>Indicator</b>	<b>SII (SE)</b>	<b>SII (SE)</b>	<b>Indicator description</b>
7	Experienced household violence for the first time following the start of the pandemic	-0.03** (0.012)	-0.06** (0.019)	Among respondents who have ever experienced psychological, physical, or sexual violence at home, percentage of respondents who report having only experienced this violence following the start of the pandemic, not before
8	Experienced increase in household violence since the start of the pandemic	-0.15*** (0.024)	-0.28*** (0.035)	Among respondents who have ever experienced psychological, physical, or sexual violence at home, percentage of respondents who report an increase in severity, frequency, or both in this violence since the start of the pandemic
9	Feels less safe in the household since the start of the pandemic	-0.05*** (0.008)	-0.05** (0.018)	Percentage of respondents who report feeling less at home than they did before the start of the pandemic
10	Feels less safe in the neighborhood since the start of the pandemic	-0.09***	-0.13***	Percentage of respondents who report feeling less at in their neighborhood than they did before the start of the pandemic

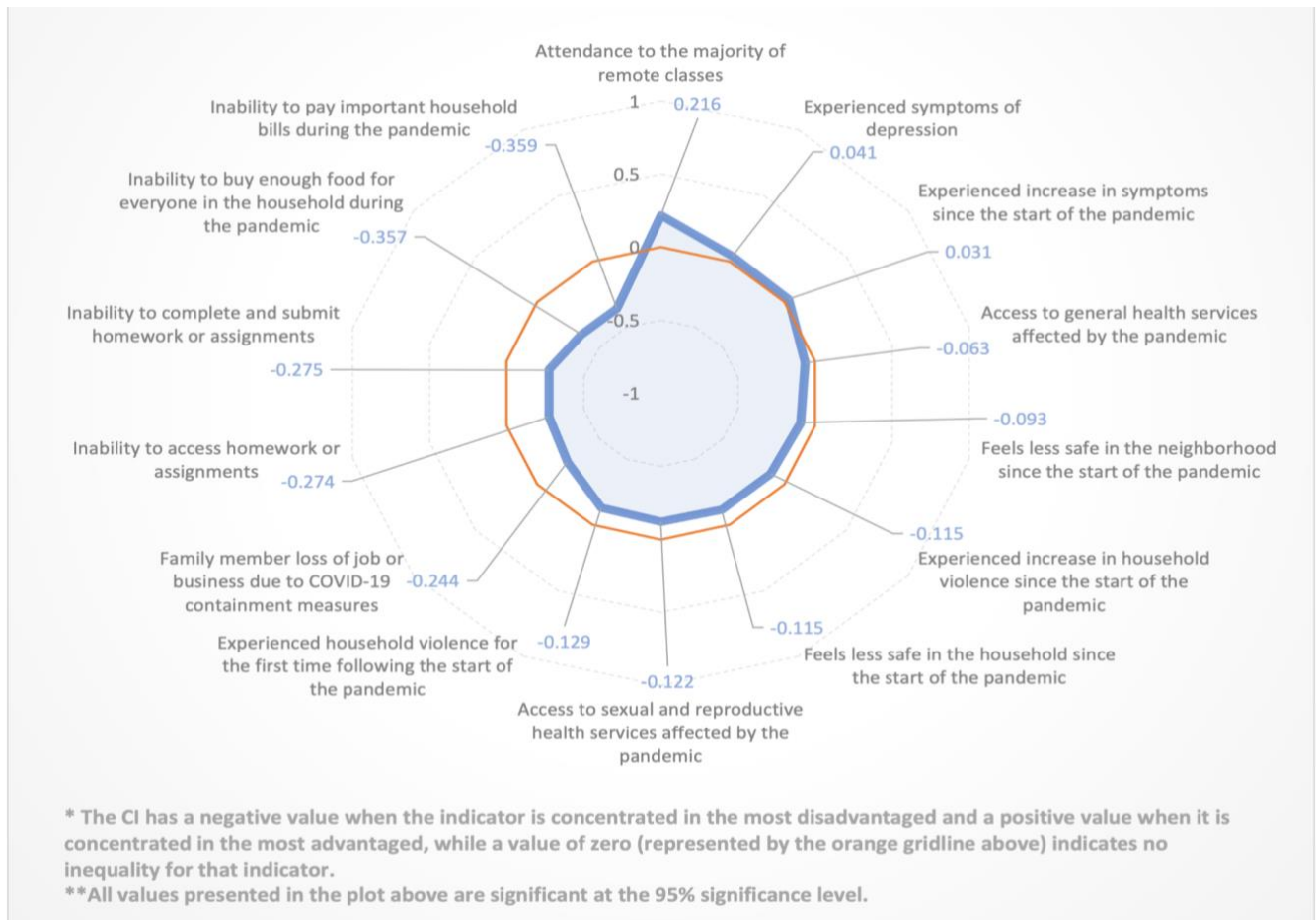
		(0.012)	(0.024)	
11	Increase in cyberbullying since the start of the pandemic	-0.01	-0.17***	Among respondents who have ever experienced virtual harrasment, percentage of respondents who report an increase in severity, frequency, or both in this behavior since the start of the pandemic
		(0.020)	(0.031)	
<b>IV. Employment and Family Financial Health</b>				
		<b>15–17- Year- Olds</b>	<b>18–24- Year-olds</b>	
<b>No.</b>	<b>Indicator</b>	<b>SII (SE)</b>	<b>SII (SE)</b>	<b>Indicator description</b>
12	Family member loss of job or business due to COVID-19 containment measures	-0.44***	-0.48***	Percentage of respondents who indicated that at least one member of their family lost their job or had to close down their business as a result of COVID-19 lockdown and containment measures
		(0.016)	(0.025)	
13	Inability to pay important household bills during the pandemic	-0.16***	-0.16***	Percentage of respondents whose family has never or almost never been able to pay important bills such as rent since the start of the pandemic
		(0.011)	(0.015)	
14	Inability to buy enough food for everyone in the household during the pandemic	-0.06***	-0.09***	Percentage of respondents whose family has never or almost never been able to buy enough food for everyone in the household since the start of the pandemic
		(0.006)	(0.011)	
<b>V. Education and Learning</b>				
		<b>15–17- Year- Olds</b>	<b>18–24- Year-olds</b>	
<b>No.</b>	<b>Indicator</b>	<b>SII (SE)</b>	<b>SII (SE)</b>	<b>Indicator description</b>
15	Inability to access homework or assignments	-0.25***	-0.38***	Percentage of respondents who disagree or strongly disagree with the following statement: "I have the means necessary to access (see, download, and work on) my homework and assignments" since the beginning of the pandemic
		( 0.015)	(0.026)	
16	Inability to complete and submit homework or assignments	-0.24***	-0.34***	Percentage of respondents who disagree or strongly disagree with the following statement: "I have the means necessary to complete and turn in my homework and assignments" since the beginning of the pandemic
		(0.014)	(0.025)	
17	Attendance to the majority of remote classes	0.10***	0.13***	Percentage of respondents who have attended at least 70% of their classes since the closure of their school facilities
		(0.011)	(0.020)	
18	Perception of less learning since the pandemic	-0.02	-0.05	Percentage of respondents who disagree or strongly disagree with the following statement: "I perceive that I learn more now than I did when I attended school in person"
		( 0.016)	( 0.029)	
<b>Notes:</b> *p-value <0.05; ** <0.01; *** <0.001; In this analysis, negative values of the SII show that the indicator measured is higher in the poorest share of participants compared to the richest share of participants.				

**Figure 1. Latin America (18 countries): Gini coefficient of income inequality, 2002-2017**



Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of data from the Household Survey Data Bank (BADEHOG).

**Figure 2. Concentration indices\* for education, employment, psychosocial wellbeing, access to health services, and violence indicators for adolescents in Mexico**



**Figure 3. Concentration indices\* for education, employment, psychosocial wellbeing, access to health services, and violence indicators for young adults in Mexico**

